



Electro-Voice®

a MARK IV company

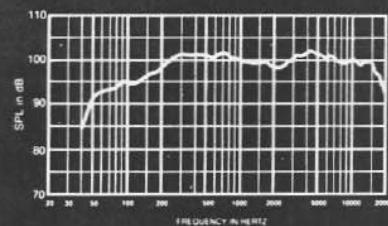


FIGURE 1
Axial Frequency Response Using
Recommended Crossover, Equalization
and Time Delay
1 Watt/1 Meter into LF Section

Model FS-212

Concert Floor-Slant Monitor

SPECIFICATIONS

Frequency Response, Measured in Farfield Calculated to One Meter on Axis, Swept One-Third-Octave Pink Noise, Anechoic Environment (see Figure 1):
50-20,000 Hz

Recommended Crossover Frequency:
1,250 Hz

Efficiency,
LF/HF: 9%/25%

Long-Term Average Power Handling Capacity per EIA Standard RS-426A and AES2-1984 (see Power Handling section),
LF/HF: 600/75 watts

Short-Term Power Handling Capacity (10 milliseconds),
LF/HF: 2,400/300 watts

Maximum Long-Term Average Midband Acoustic Output:
72 watts

Sound Pressure Level at One Meter, Indicated Input Power, Anechoic Environment, Band-Limited Pink-Noise Signal,
LF/HF,

1/1 Watt: 101/112 dB
600/75 Watts: 129/131 dB
2,400/300 Watts: 135/137 dB

Dispersion Angle Included by 6-dB-Down Points on Polar Responses, Indicated One-Third-Octave Bands of Pink Noise,
700-20,000 Hz Horizontal (see Figure 3):
60° (+40°, -20°)
600-20,000 Hz Vertical (see Figure 3):
40° (+25°, -5°)

Directivity Factor R_{θ} (Q), 600-20,000-Hz Median (see Figure 4):
15.9 (+19.9, -9.3)

Directivity Index D_i , 600-20,000-Hz Median (see Figure 4):

12.0 dB (+2.9 dB, -3.9 dB)

Distortion, 120 dB SPL at 1 Meter, Shaped Spectrum (see Figure 5),

Second Harmonic,
200 Hz: 1.1%
1,000 Hz: 0.9%
3,000 Hz: 3.2%
10,000 Hz: 1.4%

Distortion, 120 dB SPL at 1 Meter, Shaped Spectrum (see Figure 5),

Third Harmonic,
200 Hz: 1.1%
1,000 Hz: 0.6%
3,000 Hz: 0.1%
10,000 Hz: 0.3%

Transducer Complement,

LF: Two DL12X-variant woofers
HF: DH1A

Impedance,

Nominal, LF/HF:
4.0 ohms/8.0 ohms
Minimum, LF/HF:
4.7 ohms/6.5 ohms

Input Connections:

ITT Cannon EP-4-14 and EP-4-13

Enclosure Materials,

Structural:
14-ply birch plywood
Finish:
Black Ozite Super TNT carpet
Grille:
Steel with black nylon cloth covering

Dimensions,

Height: 67.3 cm (26.5 in.)
Width: 59.7 cm (23.5 in.)
Depth: 42.5 cm (16.8 in.)

Net Weight:

54.5 kg (120 lb)

Shipping Weight:

59.1 kg (130 lb)

DESCRIPTION

The Electro-Voice FS-212 concert slant monitor was designed for high-level concert-sound stage monitoring applications. The FS-212 is a two-way biamped system with a high-frequency horn and driver and two 12-inch woofers in an extremely compact enclosure.

The 12-inch woofers, which operate over the range of 70-1,250 Hz, make use of the Electro-Voice "DL" technology that features the Thermo Inductive Ring, TIR™, and PROTEF™ coating (U.S. Patent No. 4,547,632). The TIR is a non-magnetic pole-piece extension that acts as a control on drive inductance and, more importantly, provides a major heat-transfer path from the top of the voice coil, minimizing thermal power compression. PROTEF is a Teflon®-based coating applied to the top plate that protects the voice coil during violent power peaks.

For high frequencies, the FS-212 utilizes a DH1A 2-inch throat compression driver. Its unique one-piece geometrically optimized titanium dome and suspension combined with its unusually powerful magnetic motor provide maximum efficiency and precise control of the diaphragm motion. A high-temperature voice-coil design and PROTEF-coated front plate assure excellent reliability with high-power operation.

The compression driver is coupled to an HP64 60° x 40° fiberglass horn. This flat-front, constant-directivity horn is a member of the Electro-Voice HP series, and is geometrically optimized for performance from 1,250 Hz to 20,000 Hz.

Designed to survive the rigors of the road, the FS-212 is constructed of 14-ply birch plywood and covered with black Ozite Super TNT carpeting, the most rugged in the industry. The FS-212 has a steel grille covered with black nylon cloth.

APPLICATIONS

The FS-212 is ideal for use as a professional touring stage monitor where extremely high power and low distortion are required from a system housed in a compact, low-profile enclosure.

FREQUENCY RESPONSE

The frequency response of the FS-212 shown in Figure 1 was measured on axis in the far field of an anechoic environment, using a swept one-third-octave input and calculated to a one-meter equivalent distance using the inverse-square law. The system was set up using an XEQ-3 crossover with equalization and time-delay set as in Figure 8. Drive level was set for one watt of power (2.00 volts rms) delivered to the midband of the woofer section.

DIRECTIVITY

The polar response of the FS-212 speaker system at selected one-third-octave bandwidths is shown in Figure 2. These polar responses were measured in an anechoic environment at 20 feet using one-third-octave pink-noise inputs and an XEQ-3 crossover/equalizer and time delay set as in Figure 6. The frequencies selected are fully representative of the polar response of the system. Beamwidth of the system utilizing the complete one-third-octave polar data is shown in Figure 3. R_{θ} (Q) and directivity index (D) is plotted in Figure 4.

DISTORTION

Using the XEQ-3 crossover, distortion for the FS-212 speaker system was measured in the far field with an input power that would result in a sound pressure level of 120 dB at one meter using a tailored frequency spectrum typical of contemporary close-miked rock music. Plots of second- and third-harmonic distortion are shown in Figure 5.

POWER HANDLING

To our knowledge, Electro-Voice was the first U.S. manufacturer to develop and publish a power test closely related to real-life conditions. First, we use a random noise input signal because it contains many frequencies simultaneously, just like real voice or instrument program. Second, our signal contains more energy at extremely high and low frequencies than typical actual program, adding an extra measure of reliability. Third,

the test signal includes not only the overall "long-term average" or "continuous" level—which our ears interpret as loudness—but also short-duration peaks which are many times higher than the average, just like actual program. The long-term average level stresses the speaker thermally (heat). The instantaneous peaks test mechanical reliability (cone and diaphragm excursion).

Specifically, the low-frequency driver is designed to withstand the power test described in EIA Standard RS-426A. The EIA test spectrum is applied for eight hours. To obtain the spectrum, the output of a white-noise generator (white noise is a particular type of random noise with equal energy per bandwidth in Hz) is fed to a shaping filter with 6-dB-per-octave slopes below 40 Hz and above 318 Hz. When measured with the usual constant-percentage-bandwidth analyzer (one-third-octave), this shaping filter produces a spectrum whose 3-dB-down points are at 100 Hz and 1,200 Hz. This shaped signal sent to the power amplifier with the continuous power set at 600 watts into EIA equivalent impedance (45.5 volts true rms). Amplifier clipping sets instantaneous peaks at 6 dB above the continuous power, or 2,400 watts peak (91.0 volts peak).

Specifically, the high-frequency driver is designed to withstand the AES Standard AES2-1984 (ANSI S4.26-1984). The AES test spectrum is applied for two hours. To obtain this spectrum, the output of a pink-noise generator (pink noise is a particular type of random noise with equal energy per octave bandwidth) is fed into a bandpass filter with 12-dB-per-octave slopes and 3-dB-down points at 1,000 Hz and 10,000 Hz. This shaped signal is sent to the power amplifier with the continuous power set at 75 watts into the nominal impedance (24.5 volts true rms). Amplifier clipping sets instantaneous peaks at 6 dB above the continuous power, or 300 watts peak (49.0 volts true rms).

CROSSOVER, EQUALIZATION AND TIME-DELAY

Recommended for use with the FS-212 is the XEQ-3 electronic crossover. The XEQ-3 is a combination crossover/equalizer/time-delay unit which provides the circuitry necessary for optimum performance of the FS-212.

When used with the FS-212, the XEQ-3 is first set to its low/high two-way-crossover mode using the switches on the back panel of the unit. The front panel settings are then adjusted to the positions shown in Figure 6. Finally, a special high-frequency EQ module is inserted. This module is constructed as shown in Figure 6 using the blank module supplied with the XEQ-3.

CONNECTIONS

The FS-212 is equipped with ITT-Cannon EP-4 connectors for electrical connection to the woofers and compression driver. Two

connectors are installed: one male (EP-4-14) for input signal and one female (EP-4-13) for paralleling additional FS-212 loudspeakers. The mating connectors on the cable ends should be the EP-4-11-IC for the input connection and the EP-4-12-IC for the loop-through connection.

Cables, connectors and wiring accessories are being manufactured for the FS-212 speaker systems by Pro Co Sound, Inc., and Whirlwind Music Distributors, Inc. To find your local Pro Co or Whirlwind dealer, contact:

Pro Co Sound, Inc.
135 E. Kalamazoo Ave.
Kalamazoo, MI 49007

Whirlwind Music Distributors, Inc.
P.O. Box 1075
Rochester, NY 14603

The pin-out arrangement is as follows:

Pin 1 = LF (-)
Pin 2 = LF (+)
Pin 3 = HF (-)
Pin 4 = HF (+)

The low-frequency input presents a 4-ohm load while the high-frequency input presents a nominal 8-ohm load to the amplifier. The compression driver has a low-frequency protection capacitor in series.

FIELD REPLACEMENT

The FS-212 was designed for expedient field service. Loosening the four woofer-clamp bolts allows the woofer to be easily removed. A woofer failure will require replacement of the entire driver. In the case of a compression driver failure, a diaphragm assembly replacement kit with instructions is available. The diaphragm may be replaced without removing the driver by using the driver access panel on the back of the enclosure. If desired, the complete driver may be returned for service.

The following replacement parts are available from the Electro-Voice service department in Buchanan, Michigan:

LF: complete woofer; EV Part No. 812-1199
HF: diaphragm kit; EV Part No. 81147XX

ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The loudspeaker system shall be a two-way, biamped, floor-slant-monitor system. The loudspeaker system shall have two 12-inch low-frequency direct-radiating drivers, each with an 8-ohm, 2.5-inch-diameter voice coil constructed of edge-wound rectangular aluminum wire, and which together shall be capable of handling a 600-watt shaped pink-noise signal with a 6-dB crest factor for 8 hours (as per EIA Standard RS-426A). The loudspeaker system shall have a 2.0-inch-exit compression driver mounted on a fiberglass high-frequency horn. The compression driver

*XEQ-2 OK
with Fig 6 module + Experiment with Times*

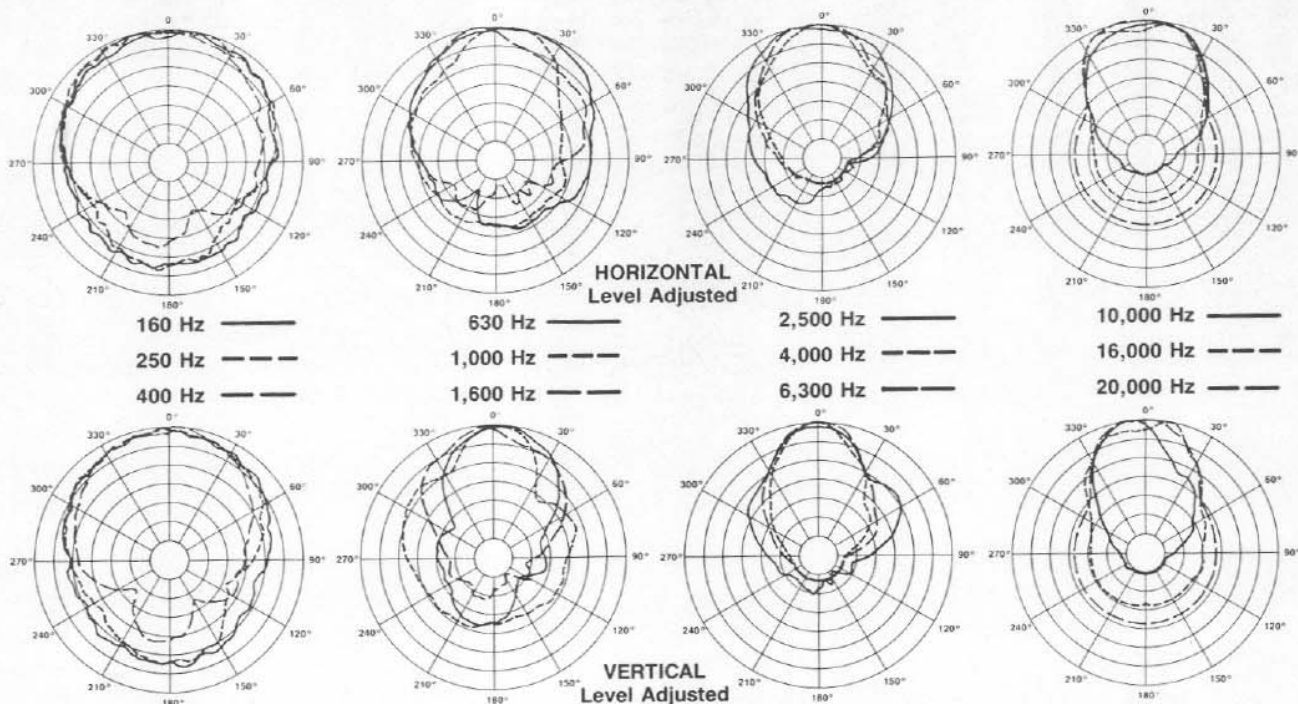


FIGURE 2
FS-212 Polar Response
 (1/3-octave, 4 volts at 20 feet)

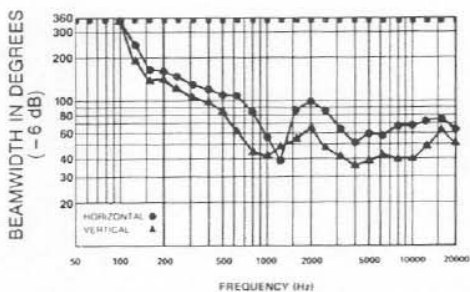


FIGURE 3
Beamwidth vs. Frequency

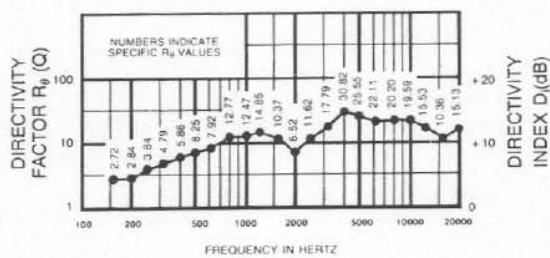


FIGURE 4
FS-212 Directivity Factor and
Directivity Index vs. Frequency

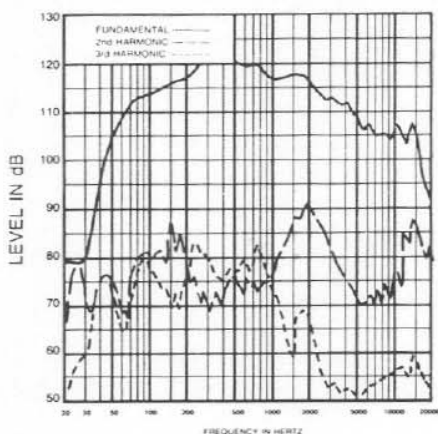


FIGURE 5
FS-212 Harmonic Distortion
 (120 dB SPL/1 meter using typical music frequency spectrum)



XEQ-3 SETTINGS

HF EQ MODULE

- R₁ — OPEN
- R₂ — OPEN
- R₃ — 83.1 kΩ
- R₄ — 14.3 kΩ
- R₅ — SHORT
- R₆ — OPEN
- R₇ — 84.2 kΩ
- R₈ — 28.2 kΩ

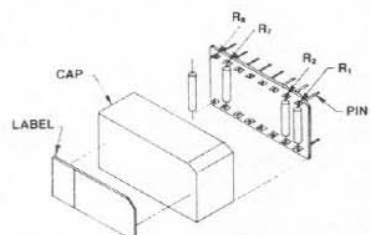
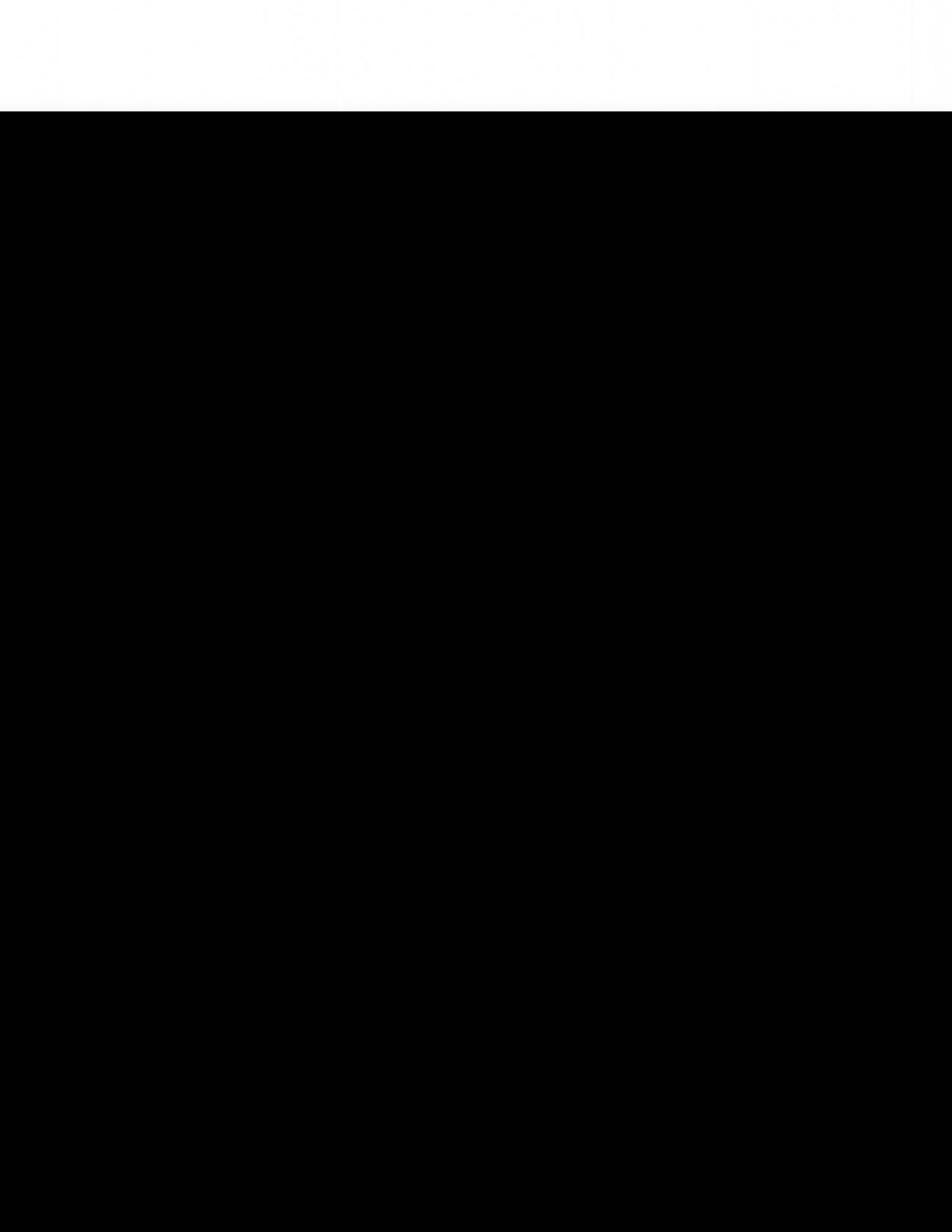


FIGURE 6
Crossover Set Up



shall have a 3.0-inch-diameter, 0.0015-inch-thick titanium dome and an 8-ohm, 3.0-inch-diameter voice coil constructed of edge-wound rectangular aluminum wire, and which shall be capable of handling a 100-watt input. The loudspeaker enclosure shall be constructed from 14-ply, 3/4-inch-thick Finnish birch plywood, shall be covered with black heavy-duty carpeting and shall have a black nylon-cloth-covered steel grille. The loudspeaker enclosure dimensions shall be 26.5 inches high, 23.5 inches wide and 16.8 inches deep and shall weigh 120 pounds. The loudspeaker system shall be the Electro-Voice FS-212.

WARRANTY (Limited) — Electro-Voice Speakers and Speaker Systems (excluding active electronics) are guaranteed for five years from date of original purchase against malfunction due to defects in workmanship and materials. If such malfunction occurs, unit will be repaired or replaced (at our option) without charge for materials or labor if delivered prepaid to the proper service facility. Unit will be returned prepaid. Warranty does not extend to finish, appearance items, burned coils, or malfunction due to abuse or operation under other than specified conditions, nor does it extend to incidental or consequential damages. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion may not apply to you. Repair by other than Electro-Voice or its authorized service agencies will void this guarantee. A list of authorized warranty service agencies is available from Electro-Voice, Inc., 600 Cecil Street, Buchanan, MI 49107 (AC/616-695-6831), and/or Electro-Voice West, 8234 Doe Avenue, Visalia, CA 93291 (AC/209-651-7777). This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Service and repair address for this product:
Electro-Voice, Inc., 600 Cecil Street,
Buchanan, Michigan 49107.

Specifications subject to change
without notice.



ELECTRO-VOICE, INC., 600 Cecil Street, Buchanan, Michigan 49107

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